

Subchapter 5 WATER SUPPLY

5:21-5.1 Water Supply System

Water supply systems, where installed, shall conform to the standards contained in this subchapter.

5:21-5.2 Capacity

- (a) The water supply system shall be adequate to handle the necessary flow, based on complete development of the tract.
- (b) When plans for future development necessitate oversizing of the water supply system, the municipality or utility authority may enter into an agreement with the developer to address the fair share of the costs.
- (c) The demand rates for all uses shall be considered in computing the total system demand. Where fire protection is provided in accordance with (e) below, the system shall be capable of providing the required fire demand plus the required maximum daily residential demand, or the peak hour flows indicated in Table 5.2 below, whichever is greater. The maximum daily demand shall be calculated by multiplying the average daily residential demand indicated in Table 5.1 by a factor of 1.5.
- (d) Average daily residential consumption shall be computed in accordance with the housing unit type and size data shown in Table 5.1. The peak daily flows shall be computed by applying a peaking factor of three (3) times the average daily residential consumption. The municipality may require deviations in the peaking factor value provided appropriate documentation and justification for the deviation from the standards is provided.
- (e) The design of the on-site water distribution system shall be adequate to provide fire protection as per ISO standard, *Fire Suppression Rating Schedule*, or per AWWA M31, *Manual of Water Supply Practices -- Distribution System Requirements for Fire Protection*, ISO method on pages 3-9, incorporated herein by reference.

5:21-5.3 System Design and Placement

- (a) System design and placement shall comply with the following construction specifications, incorporated herein by reference: all applicable NJ Department of Environmental Protection (NJ DEP) rules; the American Water Works Association (AWWA) standards; and in the Pinelands Area, the standards of the Pinelands Comprehensive Management Plan, with the strictest standards governing.
- (b) Distribution mains of the overall system shall be connected into loops so that the supply may be brought to the consumer from more than one direction. In balancing loops in a design, the Hardy-Cross*, or an equivalent, method shall be used. Manning roughness coefficients listed in Table 7.2 in N.J.A.C. 5:21-7.3 may be used in these calculations. Dead-end lines shall be permitted within the design of a looped system provided that there are no more than 20 dwelling units permanently, or no more than 50 dwelling units temporarily, on a dead-end line. When dead-end lines are used, they shall be provided with a hydrant or blowoff at the terminus as a means of flushing.

*In the *New Jersey Administrative Code* version of this document, there is an appendix on the Hardy-Cross Method, which is a method for determining water main size. Please refer to N.J.A.C. 5:21-5 for an explanation of this method.

TABLE 5.1 WATER DEMAND/GENERATION BY TYPE/SIZE OF HOUSING		
TYPE/SIZE HOUSING	NUMBER OF RESIDENTS	RESIDENTIAL WATER DEMAND^a (daily)
		(gallons per day)
Single-family detached		
2 bedroom	2.13	215
3 bedroom	3.21	320
4 bedroom	3.93	395
5 bedroom	4.73	475
Garden Apartment		
1 bedroom	1.57	120
2 bedroom	2.33	175
3 bedroom	3.56	270
Townhouse		
1 bedroom	1.69	125
2 bedroom	2.02	150
3 bedroom	2.83	210
4 bedroom	3.67	275
High Rise		
studio	1.07	80
1 bedroom	1.34	100
2 bedroom	2.14	160
Mobile home		
1 bedroom	1.73	130
2 bedroom	2.01	150
3 bedroom	3.47	260
NOTES: ^a Based on 100 gallons per person per day for single-family detached units and 75 gallons per person per day for other housing types (rounded). SOURCE: U.S. Census, Public Use File--New Jersey (units built 1975-1980)		

TABLE 5.2 DESIGN STANDARDS FOR PEAK HOUR FLOW	
TOTAL HOUSES SERVED	PEAK HOURLY RATES (gallons per minute per house)
5	8.0
10	5.0
50	3.0
100	2.0
250	1.3
500	0.8
750	0.7
1,000 or more	0.6

- (c) Valves, except on a permitted dead end, shall be located on distribution mains so that no more than one hydrant would be out of service as a result of a single water main break. They shall be located in all small branches off larger mains; and where eight- (8) inch or larger main lines intersect, a valve shall be located in each branch. At street intersections, valves shall be located near pipe intersections for ease in finding in the event of a water main break.
 - (d) In addition to the above requirements, water mains shall be valved so that not more than one-fifth of a mile would be affected by a single water main break. Geared valves on 16-inch mains or larger shall be furnished when required by the municipality.
 - (e) Gate valves shall be cast-iron body with double-disc gates, bronze mounted conforming to AWWA C500 or resilient-seated wedge, non-rising stem mechanical joint conforming to AWWA C509. Butterfly valves shall conform to AWWA C504. The type of valve to be used shall be as specified by the municipality or utility authority. Valve interior openings shall be full size, and valves on 16-inch mains or larger shall be geared and have suitable bypasses. Valve boxes shall be of the adjustable type with the cover marked "water" and direction of valve operation indicated.
 - (f) No pipe shall be placed on private property unless the owner of the land is to own or operate the pipe, or an easement deeded to the municipality or utility authority is obtained. All easements shall be a minimum of 20-feet wide unless depth of pipe, soil conditions, or additional utilities require wider. Where the easement is located adjacent to a right-of-way, the municipality or authority may approve a narrower easement.
 - (g) A building service connection shall be comprised of a corporation stop at the main, a curb stop, and a water meter. When the meter is located outside a building, an additional shut-off valve shall be installed on the discharge side of the meter. When the meter is located inside a building, valving shall be in accordance with the Plumbing Subcode of the Uniform Construction Code (N.J.A.C. 5:23-3.15). Curb stops and water meters shall be located as specified by the public or private water supplier.
1. Common water service connections shall be permitted where allowed by the Plumbing Subcode of the Uniform Construction Code (N.J.A.C. 5:23-3.15).

- (h) Where water system extensions are constructed by developers and meter fees are not paid by the developer, the water meter(s) shall be furnished by the developer and shall be of a manufacture and type approved by the municipality or utility authority. The meter(s) shall read in volume units as determined by the municipality or utility authority. Where meter fees are paid by the developer, the meter(s) shall be furnished by the municipality or utility authority.
- (i) Pipe size shall comply with the following requirements:
 - 1. Water mains shall be a minimum diameter of eight (8) inches except at the end of a permanent cul-de-sac, unless another size is required for fire flow and other criteria. A six- (6) inch main may be used when it serves not more than 20 dwelling units and only one fire hydrant.
 - 2. Building service connection pipe shall be a minimum diameter of three-quarter (3/4) inch.
 - 3. Design capacity of water mains shall be such as to maintain a minimum pressure of 20 pounds per square inch (psi) at street level under all flow conditions.
- (j) Pipe materials used in the construction of water mains shall be cement-lined ductile iron, prestressed concrete cylinder pipe, reinforced concrete pressure pipe, or PVC pipe. All pipe and appurtenances shall comply with the applicable AWWA standards in effect at the time of application. All standards referenced in this subsection are incorporated herein by reference.
 - 1. Ductile iron pipe, appurtenances, and fittings shall comply with ANSI/AWWA C110/A21.10 (fittings), C111/A21.11 (gasket joints), C115/A21.15 (flanged joints), and C151/A21.51 (pipe). Thickness shall be designed in accordance with ANSI/AWWA C150/A21.50. It shall be cement-mortar lined in accordance with ANSI/AWWA C104/A21.4. Joints shall be gasketed push-on joints or mechanical joints in conformance with ANSI/AWWA C111/A21.11. The exterior of the ductile iron pipe shall be covered with an asphaltic, epoxy-type coating. In aggressive soils, ductile iron pipe wrapped in polyethylene in accordance with ANSI/AWWA C105/A21.5 shall be used.
 - 2. Prestressed concrete cylinder pipe with rubber and steel joints shall conform to ANSI/AWWA C301; reinforced concrete pressure pipe (steel cylinder type) shall meet ANSI/AWWA C300; concrete pressure pipe (bar-wrapped steel cylinder type) shall meet ANSI/AWWA C303.
 - 3. PVC pipe, appurtenances, and fittings shall conform to ANSI/AWWA C900 or AWWA C909 for pipe sizes four inches to 12 inches and shall conform to AWWA C905 for sizes 14 inches through 36 inches. Joints shall be elastomeric-gasket couplings of a corresponding size. Laboratory performance requirements, as specified in ASTM D3139, shall be met. Solvent-cement couplings shall not be permitted. PVC pipe installations shall be provided with a metallic locator tape.
 - 4. Where transitions to flanged fittings are made, adapters approved by the municipality or water purveyor shall be used.
 - 5. Building service connection pipe shall be type K copper or polyethylene (PE) pressure pipe that complies with ANSI/AWWA C901.

- (k) Pipe bedding and backfill shall be installed in accordance with the pipe manufacturer's recommendations.
 - 1. The municipality or the authority may require the developer to provide an opinion of a professional engineer relative to the suitability of the on-site material to be used as backfill. The municipality or authority shall rely on this opinion.
 - 2. Where the on-site material is deemed suitable, the opinion shall specify the appropriate installation methods for the material. Where the on-site material is deemed not suitable, the opinion shall specify modification or replacement of the material and the appropriate installation for the specified material.

5:21-5.4 Fire Hydrants

- (a) Hydrants shall be spaced to provide necessary fire flow. The average building area served per hydrant shall not exceed 120,000 square feet. In addition, the distance between any dwelling and a hydrant shall not exceed 400 feet when measured along the street right-of-way.
- (b) Size, type, and installation of hydrants shall conform to the following specifications, incorporated herein by reference, as appropriate.
 - 1. Size, type, and installation of hydrants shall be in accordance with the requirements of the municipality or the water purveyor, or shall conform to the *AWWA Standard for Dry-Barrel Fire Hydrants*, ANSI/AWWA C502. Hydrants shall have at least three (3) outlets: one outlet shall be a pumper outlet, the other outlets shall be at least two and one-half (2½) inch nominal size. The pumper outlet shall face the street. All outlet nozzles shall be at least 12 inches above the adjoining grade. When a concrete slab is provided around the hydrant riser, the flange where the hydrant connects to the riser shall be at least two inches above the adjacent grade. Street main connections shall not be less than six inches in diameter. Hose threads on outlets shall be compatible with existing municipal equipment and shall either conform to NFPA 1963 or shall match existing municipal requirements. A valve shall be provided on connections between hydrants and street mains. All pipes, fittings, and appurtenances supplying fire hydrants shall be AWWA or ASTM approved.
 - 2. All fire hydrants shall conform to NFPA Standard 291.

